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10/590,197	11/27/2007	**Arnaud Huignard**	294729US0PCT	5542

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EXAMINER	
WIECZOREK, MICHAEL P	

ART UNIT	PAPER NUMBER
1712	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/590,197	HUIGNARD ET AL.	
	Examiner	Art Unit	
	MICHAEL WIECZOREK	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *30-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *30-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

By amendment filed May 18, 2011, claims 1 through 29 have been cancelled and claims 30 through 49 are new. Claims 30 through 48 are currently pending.

Response to Amendment

1. The declaration under 37 CFR 1.132 filed March 1, 2011 is insufficient to overcome the rejection of claim 1 based upon Uemura as set forth in the last Office action because the conditions set forth in the declaration in which plasma etching of the silicon dioxide was attempted are different from the plasma etching conditions of Uemura. Uemura teaches that plasma etching was conducted at a pressure of 0.2 Torr and at a temperature in the range of 300 to 400 °C for a time between 1 to 60 minutes (Page 5 Lines 38-44). The declaration provided by the applicant does not disclose what the temperature and pressure were during plasma treatment and only treated the silicon dioxide layer for 20 minutes.

2. Furthermore, the declaration is not persuasive because it does not meet the formal requirements of submitting a valid declaration. A declaration must include an acknowledgment by the declarant that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon. The declarant must set forth in the body of the declaration that all statements made of the declarant's own knowledge are true and that all statements made on information and belief are believed to be true (see section 715.04.II of the MPEP). These statements are missing from

the declaration submitted on March 1, 2011. Furthermore, the submitted declaration has not been dated and does not contain a valid signature from the declarant.

Response to Arguments

3. Applicant's arguments, filed May 18, 2011, with respect to the rejection(s) of claim(s) by Uemura and Chartier under 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Uemura and new prior art necessitated by the new claims.

4. Furthermore, new claim 30 is still obvious in view of Uemura in view of Okudaira. As was discussed in the previous Office Action, Uemura teaches the steps of treating a silicon-containing mineral layer by plasma etching prior to applying the hydrophobic agent. Uemura does not however teach that the plasma contains a fluorine containing gas. Okudaira teaches a method of plasma etching silicon containing layers using fluorine containing gases such as SF6 and CF4. Thus one of ordinary skill in the art would have had a reasonable expectation of success in having conducted the plasma etching step of Uemura using SF6 or CF4 instead of the oxygen comprising gas because SF6 and CF4 gas are known plasma gases in the art for etching silicon containing layers. Substitution of equivalents requires no express motivation. *In re Fount*, 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152, USPQ (CCPA 1967).

Furthermore, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 42-44 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 42 through 44 require that the thickness of the activated surface of the silicon-containing sublayer has a thickness of 20 to 250 nm, 30 to 100 nm and 30 to 75 nm, respectively. The claims lack adequate written description because there is no disclosure within the specification that the required thickness of just the activated surface region of the sublayer is within any of the above required ranges. Page 4 Lines 26-29 of the specification of the present application discloses that the silicon-containing sublayer when its surface has been activated has a total thickness of between 20 to 250 nm including the ranges of 30 to 100 nm and 30 to 75 nm but this disclosure of total sublayer thickness is different from just the activated surface region thickness as required by claims 42-44.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 33-37 and 48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. The term "cold" in claims 33 and 35 is a relative term which renders the claim indefinite. The term "cold" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Claims 33 through 36 require that the silicon-containing layer is deposited "cold" and since there is no definition or disclosure within the specification to define what temperatures are considered "cold" the claims are indefinite.

10. Claim 37 recites the limitation "the fluorosilane layer". There is insufficient antecedent basis for this limitation in the claim or in any of the parent claims. For the purposes of this examination the fluorosilane layer will be taken to be the layer formed from the hydrophobic agent since the specification discloses that the hydrophobic agents used comprises fluorosilane. Clarification on this issue is requested.

11. Claim 48 requires that the layer of hydrophobic agent has a weight per unit area of grafted fluorine of 0.1 μg/cm2 and 3.5 μg/cm2. It is not clear how a layer can have two simultaneous weights per unit area of grafted fluorine values. For the purpose of this examination the claims will be taken to mean that the weight per unit are of grafted fluorine is between 0.1 μg/cm2 and 3.5 μg/cm2 as disclosed on Page 6 Lines 19-22 of the specification. Clarification on this issue is requested.

12. The following is a quotation of the fourth paragraph of 35 U.S.C. 112:

> Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

13. Claims 34-36 are rejected under 35 U.S.C. 112, fourth paragraph, as being unpatentable for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 33 requires that the silicon-containing layer is deposited by vacuum cathode sputtering. Dependent claims 34-36 require that the silicon-containing layer is deposited by magnetron sputtering, ion beam sputtering, or by plasma enhanced chemical vapor deposition. Thus claims 34-36 fail to further limit the claims by requiring alternative coating method to the one required by the parent claim 33. For the purposes of this examination claims 34-36 will be considered as being dependent on claim 30 since the specification discloses that the deposition method of claims 34-36 are alternative coating method to vacuum cathode sputtering.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. Claims 30-32, 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al (European Patent Publication No. 0476510A1) in view of Okudaira et al (U.S. Patent # 4,330,384).

Uemura teaches a process for providing water repellency to a glass plate. The glass plate has deposited onto its surface a transparent metal oxide film layer on its surface which is further treated to provide fine unevenness to the metal oxide film layer surface. The water repellency is provided by applying a water repellent to the uneven metal oxide film layer surface which causes the water repellent/hydrophobic agent to graft/bond on the metal oxide film layer surface. (Abstract, Page 2 Lines 20-23 and Page 2 Line 56 through Page 3 Line 2)

The metal oxide film layer/sublayer formed is comprised of Silicon dioxide (Page 2 Lines 45-49 and Page 3 Lines 21-28) and thus can be considered an essentially mineral silicon-containing sublayer.

The specification of the present application discloses that the term "activated" means that a surface has undergone a treatment which has modified its electrostatic state and/or its chemical state (creation or destruction of chemical functional groups), in order to increase the reactivity of said surface, which treatment may go as far as tearing the material of the surface, thus creating irregularities (Page 3 Lines 17-24 of the specification of the present application).

As was discussed above, Uemura has the sublayer surface roughened prior to application of the water repellent material and further teaches that this is accomplished by plasma etching

(Page 3 Lines 48-54). Thus Uemura teaches activating the sublayer surface by plasma etching followed by applying the hydrophobic agent while the surface is in an activated/roughened state.

Though Uemura teaches that the silicon-containing layer is etched to activate the sublayer it does not teach that the gas used to form the plasma is fluorine-containing.

Okudaira teaches a method of plasma etching of silicon and silicon containing layers (Abstract and Column 1 Lines 6-9) wherein the taught etchant gases used to etch silicon dioxide layers include fluorine containing gases such as SF6 and CF4 (Column 2 Lines 53-59 and Column 3 Lines 7-19).

Based on the teachings of Okudaira, at the time the present invention was made it would have been obvious to one having ordinary skill in the art to have used a fluorine containing gas, such as SF6 or CF4, as the plasma etchant gas in the plasma etching step of Uemura since these gases are conventionally used gases for plasma etching and they are known in the art for being able to etch silicon dioxide films.

As for the limitation of oxygen gas, since the claim discloses that oxygen is used "where appropriate", the use of oxygen is taken to be optional. Furthermore, Okudaira teachings including oxygen into the fluorine etchant gas in the volumetric range of 3 to 20% in order to prevent undercutting during etching (Column 5 Lines 44-54).

As for claim 31, Uemura does not specifically teach that the hydrophobic agent is deposited within 1 second to 15 minutes after the surface has been activated.

However, it would have been obvious to one having ordinary skill in the art to have determined the optimum values of the relevant process parameters through routine experimentation in the absence of a showing of criticality. *In re Aller*, USPQ 233 (CCPA 1955)

The time lapse between surface activation and hydrophobic agent deposition is a relevant process parameter because it affects the entire time to complete the hydrophobic layer formation process. By shortening the time between each processing step and thereby shortening the entire production time overall production is thus increased. Thus it would have been obvious to one of ordinary skill in the art to have determined the optimal time to wait before applying the hydrophobic agent after activation of the sublayer surface (either by etching or cleaning) through routine experimentation. Furthermore, Uemura provides no teaching or suggestion that there should be a significant time lag between when the surface of the sublayer is activated and when the hydrophobic agent is applied.

As for claim 32, Uemura does not teach monitoring during the etching/activation process.

Okudaira teaches that by monitoring the etching process over etching can be eliminated and the total amount of etching can be measured (Column 3 Lines 42 through Column 4 Line 8). Thus based on the teachings of Okudaira it would have been obvious to one of ordinary skill to have monitored the etching process of Uemura so that only the oxide sublayer is etched in order to prevent over etching.

As for claim 37, Uemura teaches that the water repellent layer is deposited onto the activated surface by flow-coating (Page 3 Lines 32-36) and that typical agents used are fluorosilanes (Page 2 Lines 7-10).

As for claims 39, as was discussed above in the claim 30 rejection, the sublayer/metal oxide layer of Uemura is a silicon dioxide layer thus meeting the requirement of the sublayer being formed of SiOx where x is equal to 2. Furthermore, the examiner takes the position that

since the metal oxide layer of Uemura is an oxide it is possible for hydrogen to combine with oxide layer.

17. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al in view of Okudaira et al as applied to claim 30 above, and further in view of Anzaki et al (U.S. Patent # 6,328,857).

The teachings of Uemura in view of Okudaira as they apply to claim 30 have been discussed previously and are incorporated herein. Though Uemura teaches that the metal oxide film/sublayer can be deposited by sputtering (Page 2 Lines 53-55), Uemura does not specifically teach that the sputtering deposition method is a vacuum cathode sputtering method.

Anzaki teaches a sputtering method comprising cathode sputtering within a vacuum environment (Abstract), thus Anzaki teaches a method of vacuum cathode sputtering. The method of Anzaki comprises depositing metal oxide including silicon dioxide materials (Column 5 Lines 58-64 and Column 6 Lines 58-67) onto flat plate like substrates including window glass (Column 2 Lines 5-16 and Column 6 Lines 45-53). Anzaki further teaches that the substrate temperature during sputtering is room temperature (Column 6 Line 41) and thus the material is deposited cold.

Based on the teachings of Anzaki, at the time the present invention was made one of ordinary skill in the art would have had a reasonable expectation of success in having deposited the silicon dioxide sublayer of Uemura cold onto the glass substrate by vacuum cathode sputtering since vacuum cathode sputtering is a known method in the art for depositing silicon dioxide layers onto glass plate substrates.

18. Claims 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al in view of Okudaira et al as applied to claim 30 above, and further in view of Lopata et al (U.S. Patent # 5,487,920).

The teachings of Uemura in view of Okudaira as they apply to claim 30 have been discussed previously and are incorporated herein. Uemura teaches an example where the metal oxide layer is deposited under vacuum by PECVD (thus low-pressure PECVD) using a SiH4 precursor and an oxidizer in the form of N2O followed by plasma etching/activation within the same apparatus (thus in the same chamber or in a separate chamber) (Example 3 Pages 3 and 4) but Uemura does not teach that the metal oxide layer is deposited cold by the PECVD process.

Lopata teaches a PECVD process for depositing a silicon containing compound onto a glass surface to form an optically clear anti-fog and anti-scratch film (Abstract and Column 1 Lines 6-14) which are known in the art to be comprised of silicon dioxide (Column 1 Lines 32-56).

The method of Lopata comprises plasma CVD using a mixture of an silicon-containing compounds and oxidizers in the form of N2O and CO2 (Column 1 Line 60 through Column 2 Line 5) wherein the deposition process is conducted around ambient temperatures at reduced pressures (Column 2 Lines 15-21 and 59-63 and Column 5 Lines 21-24), thus the material is deposited cold onto the substrate. Furthermore, Lopata teaches that suitable silicon containing gases for use in the taught method include silane and silane containing compounds (Column 3 Lines 22-51).

Based on the teachings of Lopata, at the time the present invention was made it would have been obvious to one of ordinary skill in the art to have used the low pressure and low temperature PECVD process of Lopata to deposit the silicon dioxide layer in the method of Uemura because the low/cold temperature deposition process of Lopata prevents thermal degradation or distortion of the substrate during deposition.

19. Claims 38, 42-44 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al in view of Okudaira et al as applied to claim 30 above, and further in view of Akamatsu et al (U.S. Patent # 6,017,609).

The teachings of Uemura in view of Okudaira as they apply to claim 30 have been discussed previously and are incorporated herein.

In the case of claim 38, though Uemura teaches that the glass substrate is formed by a plate, and thus would have to have either a plane or curved face, (Page 2 Lines 20-23) Uemura does not specifically teach that the plate is a monolithic or laminated glass, a glass ceramic or that the treated substrate is a hard thermoplastic.

Akamatsu teaches a water-repellent glass plate (Abstract) wherein the glass substrate which forms the water-repellent glass plate is formed of a laminated glass plate (Column 3 Lines 20-33).

Based on the teachings of Akamatsu, at the time the present invention was made it would have been obvious to one having ordinary skill in the art to have used as the glass plate substrate in the method of Uemura a laminated glass plate since these types of glass plates are known in the art for being the base substrate for a water-repellent glass plate.

As for claims 42 through 44, through Uemura teaches activating/etching the surface of the sublayer, Uemura does not teach any thicknesses for the activated surface of the sublayer.

Akamatsu teaches that onto the glass substrate a functional thin film/metal oxide thin film is deposited and this functional thin film is etched/roughened prior to application of the water-repellent compound. Akamatsu further teaches that the etched depressions (grooves) have a depth of from about 10 to 400 nm. Thus, Akamatsu teaches that the activated surface of the functional thin film/sublayer has a thickness of about 10 to 400 nm. (Column 3 Lines 26-45)

Based on the teachings of Akamatsu, at the time the present invention was made it would have been obvious to one of ordinary skill in the art to have made the thickness of the activated/etched surface of Uemura in the range of 10 to 400 nm since these are known activated surface thickness in the art.

As for the specific ranges of 20 to 250 nm, 30 to 100 nm and 30 to 75 nm, these ranges are encompasses/overlap with those taught by Uemura in view of Akamatsu. Thus, it would have been obvious to one having ordinary skill in the art to have selected the portion of Akamatsu's activated surface thickness that corresponds to the claimed ranges. *In re Malagari*, 182 USPQ 549 (CCPA 1974).

As for claims 47, though Uemura teaches the use of a silane including a polyfluoroalkyl group containing silane as the hydrophobic/surface treating agent (Page 2 Lines 7-10), Uemura does not teach the use of any agent that would fit within the compound C formula (II) of claim 47.

Akamatsu teaches the use of water-repellent/hydrophobic fluorosilanes agents that would be covered by formula (II) of claim 45 (Column 3 Lines 52-59).

Based on the teachings of Akamatsu, it would have been obvious to one having ordinary skill in the art to have used the fluorosilane water-repellent agents of Akamatsu in the method of Uemura because the fluorosilane agents of Akamatsu are known water-repellent agents in the art for surface treating glass substrates.

20. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al in view of Okudaira et al as applied to claim 30 above, and further in view of Chartier et al (U.S. Patent # 5,800,918).

The teachings of Uemura in view of Okudaira as they apply to claim 30 have been discussed previously and are incorporated herein. Though Uemura teaches that the metal oxide layer/sublayer can comprise metal such as silicon, titanium and aluminum (Page 2 Lines 45-48), it does not specifically teach a silicon containing layer further comprising aluminum, titanium carbon, zirconium, zinc or sulfur.

Chartier teaches a glass substrate comprising an essentially mineral sublayer onto which is attached a hydrophobic layer (Abstract). Chartier teaches that the mineral sublayer can comprises a mixture of oxides including silicon oxides, zirconium dioxide, aluminum dioxide and titanium dioxide (Column 2 Lines 9-16).

Based on the teaches of Chartier, at the time the present invention was made it would have been obvious to one having ordinary skill in the art to have formed the sublayer of Uemura as a silicon dioxide layer further comprising zirconium dioxide, aluminum dioxide and/or titanium dioxide since it is known in the art to form a sublayer comprising a mixture of such

metal oxides and thus further including aluminum, titanium and or zirconium in the silicon containing layer.

As for claim 41, as was discussed above, though it would have been obvious to have included aluminum in the silicon-containing layer of Uemura, neither Uemura nor Chartier teach that the layer comprises up to 8% by weight of aluminum.

However, section 2144.05.II.A of the MPEP states, "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)."

Thus, at the time the present invention was made it would have been obvious to one having ordinary skill in the art to have determined optimal concentration of aluminum in the silicon-containing layer of Uemura in view of Chartier through routine experimentation since the general conditions of the sublayer are taught by the art.

21. Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al in view of Okudaira et al as applied to claim 30 above, and further in view of Murphy et al (U.S. Patent Publication No. 2002/0064663).

The teachings of Uemura in view of Okudaira as they apply to claim 30 have been discussed previously and are incorporated herein.

In the case of claim 45, though Uemura teaches activating the surfaces by etching/roughening the sublayer surface prior to applying the hydrophobic agent, neither Uemura nor Okudaira specifically teach that the surface of the sublayer is roughened to an RMS roughness of 0.1 to 40 nm.

Murphy teaches a method of forming a hydrophobic surface coating on a substrate (Abstract) wherein the substrates include glass substrates comprising a silicon oxide (SiOx) anchor/sublayer which is formed prior to applying the hydrophobic surface coating (Pages 1-2 Paragraphs 0014-0015). Murphy teaches that the silicon oxide surface it roughened to have a RMS roughness of between 4.0 and 6.0 nm (Page 2 Paragraph 0019), which is within the required range 0.1 to 40 nm.

Based on the teachings of Murphy, it would have been obvious to one having ordinary skill in the art to have roughened/etched the silicon containing sublayer of Uemura to a RMS roughness of between 4.0 and 6.0 nm since this range is a known RMS roughness range in the art for providing a effective anchor/sublayer prior to applying the hydrophobic silane compound.

As for claim 46, Uemura does not teach that the actual developed area of the sublayer after activation has an area of at least 40% greater thane the initial plane area.

Murphy teaches that the increase in surface area due to roughening is a cause effective variable because the increase in surface area increases the amount of hydrophobic silane compound per unit area that can be deposited onto the substrate and thus improving the durability properties of the resulting coating (Page 2 Paragraph 0018).

Based on the teachings of Murphy, it would have been obvious to one having ordinary skill in the art to have determined the optimum developed/activated area increase over initial

plane area of the substrate of Uemura by roughening through routine experimentation because the increase area due to activation/roughening affects how much hydrophobic material per unit area may be deposited onto the surface of the substrate. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

22. Claim 48 rejected under 35 U.S.C. 103(a) as being unpatentable over et al in view of Okudaira et al as applied to claim 30 above, and further in view of Nakamura et al (U.S. Patent # 5,413,865).

The teachings of Uemura in view of Okudaira as they apply to claim 30 have been discussed previously and are incorporated herein. As was discussed above, Ueumura teaches grafting/bonding the hydrophobic agent to the surface of the roughened sublayer and Uemura further teaches that the hydrophobic/surface treating agent is a silane containing fluorine groups (Page 2 Lines 7-10). Uemura however, does not specifically teach that the layer of hydrophobic agent has a weight per unit area of grafted fluorine between 0.1 μg/cm2 and 3.5 μg/cm2.

Nakamura teaches a method of forming a water-repellant glass substrate comprising applying a silane coating containing a fluorocarbon to a roughened metal oxide surface of the glass substrate (Column 1 Lines 7-14 and Column 2 Lines 41-52). Nakamura teaches that the amount of fluorocarbon, thus fluorine, applied to the surface is a cause effective variable because the amount applied, thus grafted/bonded to the substrate surface, affects the water repellency properties of the substrate surface (Column 5 Lines 3-6).

Based on the teachings of Nakamura, it would have been obvious to one having ordinary skill in the art to have determined the optimum value of fluorine amount per unit area applied

and grafted to the surface of the metal oxide layer of Uemura through routine experimentation since the amount of fluorine affects the water-repellency properties of the substrate surface. *In re Malagari*, 182 USPQ 549 (CCPA 1974).

Conclusion

Claims 30 through 48 have been rejected. No claims were allowed.

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Wieczorek whose telephone number is (571)270-5341. The examiner can normally be reached on Monday through Friday; 6:00 AM to 3:30 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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